Preparing for Installation

Note This publication describes the following Cisco 7600 series routers:

- Cisco 7603 Router—CISCO7603
- Cisco 7603-S Router—CISCO7603-S
- Cisco 7604 Router—CISCO7604
- Cisco 7606 Router—CISCO7606
- Cisco 7606-S Router—CISCO7606-S
- Cisco 7609 Router—CISCO7609
- Cisco 7609-S Router—CISCO7609-S
- Cisco 7613 Router—CISCO7613

Information on the Cisco 7609 Router (product number OSR-7609) is in the *Cisco 7609 Router Installation Guide*, located at this URL:

http://www.cisco.com/univercd/cc/td/doc/product/core/cis7600/hardware/osrouter/index.htm

This chapter describes how to prepare your site for Cisco 7600 series router installation and contains these sections:

- Safety, page 2-1
- WarningThis unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security., page 2-2
- Power Connection Guidelines, page 2-19
- Site Planning Checklist, page 2-32

For detailed information about module cabling requirements, see Appendix B, “Connector and Cable Specifications”

Safety

Warning **This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.**

Warning **This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.**

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.**

Warning **Read the installation instructions before connecting the system to the power source.**

Warning **This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.**

Site Requirements

This section provides site power requirements for the Cisco 7600 series routers. You should verify the site power *prior* to installing the router. Power requirements vary for each router; ensure that you verify the site power for the type of router you are installing.

For EMI recommendations, refer to the *Site Preparation and Safety Guide*.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which can occur when electronic cards or components are improperly handled, results in complete or intermittent failures. Port adapters and processor modules consist of printed circuit boards that are fixed in metal carriers. Electromagnetic interference (EMI) shielding and connectors are integral components of the carrier. Although the metal carrier helps to protect the board from ESD, use a preventive antistatic strap during handling.

Following are guidelines for preventing ESD damage:

- Always use an ESD wrist or ankle strap and ensure that it makes good skin contact.
- Connect the equipment end of the strap to an unfinished chassis surface.
- When installing a component, use any available ejector levers or captive installation screws toproperly seat the bus connectors in the backplane or midplane. These devices prevent accidentalremoval, provide proper grounding for the system, and help to ensure that bus connectors areproperly seated.
- When removing a component, use any available ejector levers or captive installation screws to release the bus connectors from the backplane or midplane.
- Handle carriers by available handles or edges only; avoid touching the printed circuit boards or connectors.
- Place a removed component board-side-up on an antistatic surface or in a static shielding container. If you plan to return the component to the factory, immediately place it in a static shielding container.
- Avoid contact between the printed circuit boards and clothing. The wrist strap only protects components from ESD voltages on the body; ESD voltages on clothing can still cause damage.

- Never attempt to remove the printed circuit board from the metal carrier.

Caution For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 megohm (Mohm).

Environmental Requirements

Insure adequate spacing between racks using the information in Table 2-1. Keep all of the vents clear of obstructions, including dust and foreign conductive material, and away from the exhaust ports of other equipment.

Table 2-1 Chassis Airfow Requirements

Chassis Model	Airflow Intake	Airflow Exhaust	Air Filter Option	Minimum Clearance (walls)	Minimum Horizontal Separation
CISCO7603 (Figure 1-13)	Right side	Left side	No	6 in (15 cm)	12 in (30.5)
CISCO7603-S (Figure 1-14)	Right side	Left side	No	6 in (15 cm)	12 in (30.5)
CISCO7604 (Figure 1-15)	Right side	Left side[1]	Yes	6 in (15 cm)	12 in (30.5)
CISCO7606 (Figure 1-16)	Right side	Left side	No	6 in (15 cm)	12 in (30.5)
CISCO7606-S (Figure 1-17)	Right side	Left side	No	6 in (15 cm)	12 in (30.5)
CISCO7609 (Figure 1-18)	Front	Rear	Yes[2]	6 in (15 cm)	12 in (30.5)
CISCO7609-S (Figure 1-18)	Front	Rear	Yes[2]	6 in (15 cm)	12 in (30.5)
CISCO7613 (Figure 1-19)	Right side	Left side	No	6 in (15 cm)	12 in (30.5)

1. See Installing the Air Filter Assembly on a Cisco 7606 Router and the Cisco 7606-S Router (Optional), page 5-119.
2. See Installing the Air Filter Assembly on a Cisco 7606 Router and the Cisco 7606-S Router (Optional), page 5-119.

Heat dissipation is an important consideration for sizing the air-conditioning requirements for an installation. The power and heat associated with a Cisco 7600 series router varies based upon these considerations:

- Power supply type
- Module types and quantities
- Average traffic levels

Unless otherwise noted, the information in Table 2-2 through Table 2-18 assumes worst-case conditions (with GBICs and port adapters installed, if applicable), so typical numbers are approximately 30 percent below the numbers listed here. See Table 2-19 for a sample calculation of a router configuration.

This section provides the power and heat numbers for the Cisco 7600 series chassis and modules. The following power requirements and heat dissipation tables are provided:

- Chassis and fan trays—Table 2-2
- Supervisor engines—Table 2-3
- Policy Feature Cards (PFCs)—Table 2-4
- Distributed Forwarding Cards (DFCs)—Table 2-5

- Switch fabric modules—Table 2-6
- 10-Gigabit Ethernet modules—Table 2-7
- Gigabit Ethernet modules—Table 2-8
- 10/100/1000 Ethernet modules—Table 2-9
- Fast Ethernet switching modules—Table 2-10
- 10/100 Ethernet switching modules—Table 2-11
- 10BASE Ethernet switching modules—Table 2-12
- FlexWAN and Enhanced FlexWAN modules—Table 2-13
- Service modules—Table 2-14
- SPA Interface Processors (SIPs)—Table 2-15
- Ethernet service cards—Table 2-16
- Optical service modules (OSMs)—Table 2-17
- Miscellaneous cards—Table 2-18

Note Module power is the output from the power supply (internal to the system). The AC-input power is the input from the outlet to the power supply. The percentage difference between the two values is the efficiency of the power supply.

Table 2-2 Power Requirements and Heat Dissipation—Chassis and Fan Trays

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
Cisco 7603 chassis						
FAN-MOD-3 fan tray	0.80	34.00	43.00	145.00	46.00	156.00
FAN-MOD-3HS fan tray	2.98	125.16	156.45	534.28	168.23	574.49
Cisco 7604 chassis						
FAN-MOD-4HS fan tray	2.29	96	120	411	129	441
Cisco 7606 chassis						
FAN-MOD-6	1.05	44	55	188	59	202
Cisco 7606 chassis						
FAN-MOD-6HS	4.29	180	225	769	242	827
Cisco 7606 chassis						
FAN-MOD-6SHS	7.40	311	389	1327	418	1427
Cisco 7609 chassis						
with tiered-speed redundant fans	11.5	483	604	2062	649	2217
Cisco 7609-S chassis						
FAN-MOD-9SHS	7.00	294.00	368.00	1255.00	395.00	1349.00

Table 2-2 Power Requirements and Heat Dissipation—Chassis and Fan Trays (continued)

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
Cisco 7613 chassis						
WS-C6K-13SLOT-FAN2 fan tray	7.10	298.20	372.75	1272.94	400.81	1368.75

Note The module power values are based on 42 VDC. Power is distributed to each slot in the chassis from the power supply's 42 VDC output. Each module has DC-to-DC power supplies that convert the 42 VDC into +2.5 VDC, +3.3 VDC, and +5 VDC to power the module. The 42 VDC is independent of the power supply's input voltage, either 110 VAC or 220 VAC.

Table 2-3 lists the power and the heat numbers for the supervisor engines.

Table 2-3 Power Requirements and Heat Dissipation—Supervisor Engines

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-X6K-S2-MSFC2 Supervisor Engine 2 with PFC2 and MSFC2 daughter cards	3.46	145.32	181.65	620.33	195.32	667.03
WS-X6K-S2U-MSFC2 Supervisor Engine 2 with PFC2 and MSFC2 daughter cards—Has 512 MB of DRAM	3.46	145.32	181.65	620.33	195.32	667.03

Table 2-3 Power Requirements and Heat Dissipation—Supervisor Engines (continued)

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-SUP32-10GE-3B Supervisor Engine 32 with PFC3B and MSFC2A daughter cards	4.19	175.98	219.98	751.21	236.53	807.76
WS-SUP32-GE-3B Supervisor Engine 32 with PFC3B and MSFC2A daughter cards	3.69	154.98	193.73	661.57	208.31	711.37
WS-SUP720 Supervisor Engine 720 with PFC3A daughter card and integrated MSFC3 and switch fabric	7.50	315.0	393.75	1344.66	423.39	1445.87
WS-SUP720-3B Supervisor Engine 720 with PFC3B daughter card and integrated MSFC3 and switch fabric	6.72	282.24	350.80	1204.81	379.35	1295.5
WS-SUP720-3BXL Supervisor Engine 720 with PFC3BXL daughter card and integrated MSFC3 and switch fabric	7.82	328.44	410.55	1402.03	441.45	1507.56
RSP720-3C-GE	6.90	290	362.50	1237.93	389.78	1331.11
RSP720-3CXL-GE	8.10	340.20	425.25	1452.23	457.26	1561.54
RSP720-3C-10GE	8.80	370	462.50	1579.43	497.31	1698.31
RSP720-3CXL-10GE	10	420	525	1792.87	564.51	1927.82

Table 2-4 lists the power and the heat numbers for the Policy Feature Cards (PFCs).

Table 2-4 Power Requirements and Heat Dissipation—Policy Feature Cards (PFCs)

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-F6K-PFC3A Policy Feature Card 3A	2.25	94.50	118.13	403.40	127.02	433.76
WS-F6K-PFC3B Policy Feature Card 3B	1.47	61.74	77.18	263.55	82.98	283.39
WS-F6K-PFC3BXL Policy Feature Card 3BXL	2.57	107.94	134.93	460.77	145.08	495.45

Table 2-4 Power Requirements and Heat Dissipation—Policy Feature Cards (PFCs)

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
VS-F6K-PFC3C Policy Feature Card 3C	1.90	79.80	99.75	340.65	107.26	366.29
VS-F6K-PFC3CXL Policy Feature Card 3CXL	2.50	105.00	131.25	448.22	141.13	481.96

Table 2-5 lists the power and the heat numbers for the Distributed Forwarding Cards (DFCs).

Table 2-5 Power Requirements and Heat Dissipation—Distributed Forwarding Cards (DFCs)

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-F6K-DFC Distributed Forwarding Card	2.10	88.20	110.25	376.50	118.55	404.84
WS-F6K-DFC3A Distributed Forwarding Card 3A	2.57	107.94	134.93	460.77	145.08	495.45
WS-F6K-DFC3B Distributed Forwarding Card 3B	1.67	70.14	87.68	299.41	94.27	321.95
WS-F6K-DFC3BXL Distributed Forwarding Card 3BXL	2.38	99.96	124.95	426.70	134.35	458.82
WS-F6700-CFC Centralized Forwarding Card	0.75	31.5	39.38	134.47	42.34	144.59

Table 2-5 Power Requirements and Heat Dissipation—Distributed Forwarding Cards (DFCs) (continued)

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-F6700-DFC3A Distributed Forwarding Card 3A	3.00	126	157.5	537.86	169.35	578.35
WS-F6700-DFC3B Distributed Forwarding Card 3B	2.7	113.40	141.75	484.08	152.42	520.51
WS-F6700-DFC3BXL Distributed Forwarding Card 3BXL	3.3	138.60	173.25	591.65	186.29	636.18
WS-F6700-DFC3C Distributed Forwarding Card 3C for use on CEF720 modules. Supported only with Supervisor Engine 720 and Supervisor Engine 720-10GE	1.65	69.30	86.63	295.82	93.15	318.09
WS-F6700-DFC3CXL Distributed Forwarding Card 3CXL for use on CEF720 modules. Supported only with Supervisor Engine 720 and Supervisor Engine 720-10GE.	2.35	98.70	123.38	421.33	132.66	453.04

Table 2-6 lists the power and the heat numbers for the switch fabric modules.

Table 2-6 Power Requirements and Heat Dissipation—Switch Fabric Modules

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-C6500-SFM Switch Fabric Module	2.79	117.18	146.5	500.2	157.5	537.86
WS-X6500-SFM2 Switch Fabric Module 2	3.09	129.78	162.23	554	174.4	595.7

Table 2-7 lists the power and the heat numbers for the 10-Gigabit Ethernet modules.

Note For all WS-X67xx modules, the values shown are for the baseboard only. When the baseboard has a CFC or DFC3 daughter card installed, you must add the daughter card power to the baseboard power to get the total slot power. For all other modules that support a mandatory or optional daughter card, you must add the daughter card power to the baseboard power to get the total slot power.

Table 2-7 Power Requirements and Heat Dissipation—10-Gigabit Ethernet Modules

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-X6502-10GE 2-port 10-Gigabit Ethernet module	3.30	138.60	173.25	591.65	186.29	636.18
WS-X6704-10GE 4-Port 10-Gigabit Ethernet module	6.28	263.76	329.70	1125.93	354.52	1210.67
WS-X6708-10G-3C 8-Port 10-Gigabit Ethernet module with WS-F6700-DFC3C daughter card.	10.58	444.36	555.45	1896.86	600.49	2050.66
WS-X6708-10G-3CXL 8-Port 10-Gigabit Ethernet module with WS-F6700-DFC3CXL daughter card.	11.28	473.76	592.20	2022.36	640.22	2186.34

Table 2-8 lists the power and the heat numbers for the Gigabit Ethernet modules.

Table 2-8 Power Requirements and Heat Dissipation—Gigabit Ethernet Modules

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-X6316-GE-TX 16-port 1000BASE-T Gigabit Ethernet module	5.15	216.3	270.38	923.33	290.73	992.83
WS-X6408A-GBIC 8-port 1000BASE-X Gigabit Ethernet module	2.00	84.00	105.00	358.58	112.90	385.56
WS-X6416-GBIC 16-port 1000BASE-X Gigabit Ethernet module	2.81	118.02	147.53	503.8	158.63	541.72

Table 2-8 Power Requirements and Heat Dissipation—Gigabit Ethernet Modules (continued)

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-X6416-GE-MT 8-port 1000BASE-SX Gigabit Ethernet module	2.50	105.00	131.25	448.22	141.13	481.96
WS-X6516-GBIC 16-port 1000BASE-X Gigabit Ethernet module	3.40	142.80	178.50	609.58	191.94	655.46
WS-X6516A-GBIC 16-port 1000BASE-X Gigabit Ethernet module	3.62	152.04	190.05	649.02	204.35	697.87
WS-X6724-SFP 24-Port 1000BASE-X Ethernet module	2.23	99.66	117.08	399.81	125.89	429.90
WS-X6748-SFP 48-Port 1000BASE-X Ethernet module	5.32	223.44	279.30	953.81	300.32	1025.60
WS-X6816-GBIC 16-Port1000BASE-X Gigabit Ethernet module	3.84	161.28	201.60	688.46	216.77	740.28

Table 2-9 lists the power and the heat numbers for the 10/100/1000 Ethernet switching modules.

Table 2-9 Power Requirements and Heat Dissipation—10/100/1000 Ethernet Switching Modules

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-X6148-GE-TX 48-port 10/100/1000 Ethernet module	2.47	104.0	130.0	443.0	139.0	476.0
WS-X6148V-GE-TX 48-port 10/100/1000 Ethernet module with WS-F6K-VPWR-GE PoE daughter card	2.89	121.38	151.72	518.14	163.15	557.14
WS-X6148-GE-45AF 48-port 10/100/1000 Ethernet module with WS-F6K-GE48-AF PoE daughter card	2.65	111.30	139.13	475.11	149.60	510.87
WS-X6148A-GE-TX 48-port 10/100/1000 Ethernet module	2.5	105.0	131.25	448.22	141.13	481.96

Table 2-9 Power Requirements and Heat Dissipation—10/100/1000 Ethernet Switching Modules (continued)

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-X6148A-GE-45AF 48-port 10/100/1000 Ethernet module with WS-F6K-GE48-AF PoE daughter card	2.68	112.56	140.70	480.49	151.29	516.66
WS-X6516-GE-TX 16-port 10/100/1000 Ethernet module	3.45	144.90	181.13	618.54	194.76	665.10
WS-X6548-GE-TX 48-port 10/100/1000 Ethernet module	2.98	125.16	156.45	534.28	168.23	574.49
WS-X6548V-GE-TX 10/100/1000 Ethernet module with WS-F6K-VPWR-GE PoE daughter card	3.40	142.80	178.50	609.58	191.94	655.46
WS-X6548-GE-45AF 48-port 10/100/1000 Ethernet module with WS-F6K-GE48-AF PoE daughter card	3.16	132.72	165.90	566.55	178.39	609.19
WS-X6748-GE-TX 10/100/1000 Ethernet module	7.00	294.00	367.50	1255.01	395.16	1349.48

Table 2-10 lists the power and the heat numbers for the Fast Ethernet switching modules.

Table 2-10 Power Requirements and Heat Dissipation—Fast Ethernet Switching Modules

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-X6148-FE-SFP 48-port 100BASE-X module	2.3	96.60	120.75	412.36	129.84	443.40
WS-X6224-100FX-MT 24-port 100BASE-FX Ethernet module, MMF	1.90	79.8	99.75	340.65	107.26	366.3
WS-X6324-100FX-MM 24-port 100BASE-FX Ethernet module, MMF	1.52	63.84	79.8	272.52	85.81	293.03

Table 2-10 Power Requirements and Heat Dissipation—Fast Ethernet Switching Modules

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-X6324-100FX-SM 24-port 100BASE-FX Ethernet module, SMF	1.52	63.84	79.8	272.52	85.81	293.03
WS-X6524-100FX-MM 24-port 100BASE-FX Ethernet module	1.90	79.8	99.75	340.65	107.3	366.3

Table 2-11 lists the power and the heat numbers for the 10/100 Ethernet switching modules.

Table 2-11 Power Requirements and Heat Dissipation—10/100 Ethernet Switching Modules

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-X6148-RJ-21 48-port 10/100 Ethernet module	2.39	100.38	125.48	428.5	134.92	460.75
WS-X6148-RJ21V 48-port 10/100 Ethernet module with WS-F6K-VPWR PoE daughter card	2.39	100.38	125.48	428.50	134.02	460.75
WS-X6148-21AF 48-port 10/100 Ethernet module with WS-F6K-FE48-AF PoE daughter card	2.57	107.94	134.93	460.77	145.08	495.45
WS-X6148-RJ-45 48-port 10/100 Ethernet module	2.39	100.38	125.48	428.50	134.92	460.75
WS-X6148-RJ45V 48-port 10/100 Ethernet module with WS-F6K-VPWR PoE daughter card	2.39	100.38	125.48	428.50	134.92	460.75
WS-X6148-45AF 48-port 10/100 Ethernet module with WS-F6K-FE48-AF PoE daughter card	2.57	107.94	134.93	460.77	145.08	495.45
WS-X6148A-RJ-45 48-port 10/100 Ethernet module	1.00	42.0	52.5	179.29	56.45	192.78
WS-X6148A-45AF 48-port 10/100 Ethernet module	2.57	107.94	134.93	460.77	145.08	495.45

Table 2-11 Power Requirements and Heat Dissipation—10/100 Ethernet Switching Modules (continued)

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-X6148X2-RJ-45 96-port 10/100 Ethernet module	2.65	111.30	139.13	475.11	149.60	510.87
WS-X6148X2-45AF 96-port 10/100 Ethernet module with WS-F6K-FE48X2-AF PoE daughter card	3.07	128.94	161.18	550.41	173.31	591.84
WS-X6196-RJ-21 96-port 10/100 Ethernet module	2.74	115.08	143.85	491.25	154.68	528.22
WS-X6196-21AF 96-port 10/100 Ethernet module with WS-F6K-FE48X2-AF PoE daughter card	3.16	132.72	165.90	566.55	178.39	609.19
WS-X6248A-TEL 48-port 10/100 Ethernet module (telco)	2.69	113	141.23	482.28	151.85	518.58
WS-X6348-RJ21V 48-port 10/100 Ethernet module with WS-F6K-VPWR PoE daughter card	2.39	100.38	125.48	428.5	134.92	460.75
WS-X6348-RJ-45 48-port 10/100 Ethernet module	2.39	100.38	125.48	428.5	134.92	460.75
WS-X6348-RJ-45V 48-port 10/100 Ethernet module with WS-F6K-VPWR PoE daughter card	2.39	100.38	125.48	428.5	134.92	460.75
WS-X6548-RJ-21 48-port 10/100 Ethernet module	2.90	121.80	152.25	519.93	163.71	559.07
WS-X6548-RJ-45 48-port 10/100 Ethernet module	2.90	121.80	152.25	519.93	163.71	559.07

Table 2-12 lists the power and the heat numbers for the 10BASE Ethernet switching modules.

Table 2-12 Power Requirements and Heat Dissipation—10BASE Ethernet Switching Modules

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-X6024-10FL-MT 24-port 10BASE-FL Ethernet module	1.52	63.84	79.8	272.52	85.81	293.0

Table 2-13 lists the power and the heat numbers for the FlexWAN and the enhanced FlexWAN modules.

Table 2-13 Power Requirements and Heat Dissipation—FlexWAN and Enhanced FlexWAN Modules

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-X6182-2PA FlexWAN module	2.38	99.96	125	426.7	134.35	458.82
WS-X6582-2PA Enhance FlexWAN module	2.50	105.00	131.25	448.22	141.13	481.96

Table 2-14 lists the power and the heat numbers for the available service modules.

Table 2-14 Power Requirements and Heat Dissipation—Service Modules

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
ACE10-6500-K9 Applications Control Engine (ACE) module	5.23	219.66	274.58	937.67	295.24	1008.25
WS-SVC-ADM-1-K9 Traffic Anomaly Detector Module	4.00	168.00	210.00	717.15	225.81	771.13
WS-SVC-AGM-1-K9 Anomaly Guard Module	4.00	168.00	210.00	717.15	225.81	771.13
WS-SVC-AON-1-K9 Application-Oriented Networking (AON) module	4.00	168.00	210.00	717.15	225.81	771.31
WS-SVC-CMM Communications Media Module	6.00	252.0	315.0	1075.73	338.71	1156.69
WS-SVC-CSG-1 Content Services Gateway module	3.00	126.0	157.5	537.86	169.35	578.35
WS-SVC-FWM-1-K9 Firewall Services Module	4.09	171.78	214.73	733.29	230.89	788.48
WS-SVC-IDSM2-K9 Intrusion Detection System Module 2	2.50	105.00	131.25	448.22	141.13	481.96
WS-SVC-IPSEC-1 IPSec VPN Services module	1.89	79.38	99.23	338.85	106.69	364.36
WS-SVC-MWAM-1 Multiprocessor WAN Application Module	3.57	149.94	187.43	640.06	201.53	688.23

Table 2-14 Power Requirements and Heat Dissipation—Service Modules (continued)

Model Number/ Module Type	Module Current (A)	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-SVC-NAM-1 Network Analysis Module 1	2.89	121.38	151.73	518.14	163.15	557.14
WS-SVC-NAM-2 Network Analysis Module 2	3.47	145.74	182.18	622.13	195.89	668.95
WS-SVC-PSD-1 Persistent Storage Device module	4.00	168.0	210.0	717.15	225.81	771.13
WS-SVC-WEBVPN-K9 WebVPN Services module	2.94	123.48	154.35	527.11	165.97	566.78
WS-SVC-WISM-1-K9 Wireless Services Module (WiSM)	6.07	254.94	318.68	1088.25	342.66	1170.19
WS-SVC-WLAN-1-K9 Wireless LAN Services module	3.10	130.20	162.75	555.79	175.0	597.63
WS-X6066-SLB-S-K9 Content Switching module with SSL	2.15	90.30	112.88	385.47	121.37	414.48

Table 2-15 lists the power and the heat numbers for SIP modules.

Table 2-15 Power Requirements and Heat Dissipation—SIPs

Model Number/ Module Type	Module Current (A) @ 42 VDC	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
7600-SIP-200	5.69	239	299	1021	322	1100
7600-SIP-400	5.95	250	312	1065	338	1154
7600-SIP-600	6.42	270	338	1153	363	1240

Table 2-16 lists the power and the heat numbers for Ethernet Services modules.

Table 2-16 Power Requirements and Heat Dissipation—Ethernet Services

Model Number/ Module Type	Module Current (A) @ 42 VDC	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
7600-ES20-10G3CXL	8.11	341	426	1454	458	1563
7600-ES20-10G3C	8.11	341	426	1454	458	1563

Table 2-16 Power Requirements and Heat Dissipation—Ethernet Services

Model Number/ Module Type	Module Current (A) @ 42 VDC	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
7600-ES20-GE3CXL	8.11	341	426	1454	458	1563
7600-ES20-GE3C	8.11	341	426	1454	458	1563
7600-ES+2TGCXL	7.06	297	371.25	1267.81	399.19	1363.24
7600-ES+2TG3C	6.38	268	335	1144.02	360.21	1230.13
7600-ES+4TGCXL	9.49	399	498.75	1703.23	536.29	1831.43
7600-ES+4TG3C	8.82	370	362	1236.23	497.31	1698.31
7600-ES+40G3C	9.3	391	488.75	1669.08	122.31	417.69
7600-ES+20G3CXL	7.25	305	381.25	1301.96	409.94	1399.96
7600-ES+20G3C	6.58	276	345	1178.17	370.96	1266.85
7600-ES+40G3CXL	9.97	419	523.75	1788.60	563.17	1923.23

Table 2-17 lists the power and the heat numbers for Optical Service modules (OSMs).

Table 2-17 Power Requirements and Heat Dissipation—OSMs

Model Number/ Module Type	Module Current (A) @ 42 VDC	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
OSM-2OC12-POS-MM, -SI, -SL OC-12 POS, 2-port	3.35	141	176	602	190	648
OSM-2OC12-POS-MM+, -SI+ OC-12 POS, 2-port	3.35	141	176	816	190	648
OSM-4OC12-POS-MM, -SI, -SL OC-12 POS, 4-port	4.78	201	251	857	270	921
OSM-4OC12-POS-SI+ OC-12 POS, 4-port	4.54	191	239	816	257	877
OSM-4OC3-POS-SI OC-3 POS, 4-port	2.42	102	128	437	138	4.70
OSM-4OC3-POS-SI+ OC-3 POS, 4-port	2.42	102	128	437	138	4.70
OSM-8OC3-POS-SI, -SL OC-3 POS, 8-port	3.57	150	187	640	202	688
OSM-8OC3-POS-SI+, -SL+ OC-3 POS, 8-port	3.57	150	187	640	202	688
OSM-16OC3-POS-SI, -SL OC-3 POS, 16-port	5.09	214	267	913	287	981

Table 2-17 Power Requirements and Heat Dissipation—OSMs

Model Number/ Module Type	Module Current (A) @ 42 VDC	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
OSM-16OC3-POS-SI+ OC-3 POS, 16-port	4.83	203	254	868	271	925
OSM-2OC12-ATM-MM, -SI OC-12 ATM, 2-port	3.61	152	190	649	204	698
OSM-2OC12-ATM-MM+, -SI+ OC-12 ATM, 2-port	4.00	168	210	717	226	771
OSM-1OC48-POS-SS, -SI, -SL OC-48 POS, 1-port	4.26	179	223	762	240	819
OSM-1OC48-POS-SS+, -SI+, -SL+ OC-48 POS, 1-port	3.90	164	205	699	220	752
OSM-12CT3/DS0 Channelized T-3 to DS-0, 12-port	2.80	118	147	502	158	540
OSM-1CHOC12/T1-SI Channelized OC-12/STM-4 to DS-0, 1 port	2.80	118	147	502	158	540
OSM-1CHOC12/T3-SI Channelized OC-12, 1-port	3.76	158	231	789	248	848
OSM-1CHOC48/T3-SS Channelized OC-48, 1-port	5.76	242	197	672	212	723
OSM-2OC48/1DPT-SS, -SI, -SL OC-48 DPT[1]/POS, 2-ports	3.59	151	302	1031	325	1108
OSM-4GE-WAN-GBIC[2] Gigabit Ethernet WAN Services Module, 4-port	5.07	213	188	644	203	692
OSM-2+4GE-WAN+ Gigabit Ethernet WAN Services Module, 2+4-port	3.76	158	267	911	287	979

1. DPT = Dynamic Packet Transport
2. GBICs = Gigabit Interface Converters

Table 2-18 lists the power and the heat numbers for miscellaneous modules.

Table 2-18 Power Requirements and Heat Dissipation—Miscellaneous Modules

Model Number/ Module Type	Module Current (A) @ 42 VDC	Module Power (Watts)	AC		DC	
			AC-Input Power (Watts)	Heat Diss. (BTU/HR)	DC-Input Power (Watts)	Heat Diss. (BTU/HR)
WS-X6066-SLB-APC Content Switching Module	3.0	126.0	157.5	537.9	169.35	578.35

Table 2-19 provides a sample calculation of power and heat dissipation for the following router configuration:

- Cisco 7603 Router chassis (including AC-input power supplies)
- One WS-X6K-S2U-MSFC2 supervisor engine
- Two 4-port OC-12 POS modules

Table 2-19 Sample Calculation of Router Configuration

Model Number/ Module Type	AC-Input Power (Watts)	DC-Output Power (Watts)	Heat Diss. (BTU/HR)	Input Current			
				90 VAC (Amps)	120 VAC (Amps)	180 VAC (Amps)	240 VAC (Amps)
Cisco 7603 Router chassis (with fans)	88	34	302	0.98	0.74	0.49	0.37
WS-X6K-S2U-MSFC2	182	145	620	2.02	1.57	1.01	0.76
OSM-4OC12-POS-MM OC-12 module 4-port	502	402	1714	5.58	4.18	2.78	2.10
Total	751	565	2565	8.35	6.26	4.16	3.14

Power Requirements

Warning **Read the installation instructions before connecting the system to the power source.**

Follow these requirements when preparing your site for the router installation:

- The redundant power option provides a second, identical power supply to ensure that power to the chassis continues uninterrupted if one power supply fails or input power on one line fails.
- In systems configured with the redundant power option, connect each of the two power supplies to a separate input power source. If you fail to do this, your system might be susceptible to total power failure due to a fault in the external wiring or a tripped circuit breaker.
- To prevent a loss of input power, be sure that the total maximum load on each circuit supplying the power supplies is within the current ratings of the wiring and breakers.

- In some systems, you might use an uninterruptible power supply (UPS) to protect against power failures at your site. Avoid UPS types that use ferroresonant technology. These UPS types can become unstable with systems like the Cisco 7600 series router, which can have substantial current draw fluctuations due to bursty data traffic patterns.

Use the information in Table 2-2 through Table 2-18 to estimate the power requirements and heat dissipation of a Cisco 7600 series router based on a given configuration of the router. Table 2-19 provides a sample calculation. Determining power requirements might be useful for planning the power distribution system needed to support the router.

Power Connection Guidelines

This section provides the guidelines for connecting the Cisco 7600 series router AC and DC power supplies to the site power source.

AC-Powered Systems

Basic guidelines for AC-powered systems include the following:

- Each chassis power supply should have its own dedicated branch circuit.
- The circuit must be protected by a dedicated two-pole circuit breaker. For North America, the circuit breaker should be rated as follows:
  - 15A for the 950 W power supply
  - 15A or 20A for the 1400 W power supply
  - 20A for the 1900 W power supply
  - 20A for the 2700 W power supply
  - 20A for the 3000 W power supply
  - 30A for the 4000 W power supply.
  - 20A for the 6000 W power supply (one for each of two inputs)

  For everywhere else, the circuit breaker should be sized according to the power supply input rating and local or national code requirements.
- The AC power receptacles used to plug in the chassis must be the grounding type. The grounding conductors that connect to the receptacles should connect to protective earth ground at the service equipment.

Warning **Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.**

Warning **The plug-socket combination must be accessible at all times because it serves as the main disconnecting device.**

Warning **This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.**

Table 2-20 lists the AC-input power cord options, specifications, and Cisco product numbers for the 950 W, 1400 W, 1900 W, 3000 W, 4000 W, and the 6000 W AC-input power supplies. Table 2-20 also references power cord illustrations.

Table 2-20 AC-Input Power Cord Options

Locale	Part Number	Length	Plug Rating	Power Cord Reference Illustration
950 W Power Supply (PWR-950-AC=)				
North America	CAB-AC15A-90L-US(=)	8 feet (2.5m)	125VAC, 15A	Figure 2-1
Europe	CAB-AC10A-90L-EU(=)	8 feet (2.5m)	250VAC, 10A	Figure 2-2
United Kingdom	CAB-AC10A-90L-UK(=)	8 feet (2.5m)	250VAC, 10A	Figure 2-3
Italy	CAB-AC10A-90L-IT(=)	8 feet (2.5m)	250VAC, 10A	Figure 2-4
Australia	CAB-AC10A-90L-AU(=)	8 feet (2.5m)	250VAC, 10A	Figure 2-5
1400 W Power Supply (PWR-1400-AC=)				
Argentina	CAB-7513ACR=	14 feet (4.3 m)	10 A, 250 VAC	Figure 2-6
Australia, New Zealand	CAB-7513ACA=	14 feet (4.3 m)	15 A, 250 VAC	Figure 2-7
Continental Europe	CAB-7513ACE=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-8’
	CAB-2500W-EU=		16 A, 250 VAC	Figure 2-9
International	CAB-AC-2500W-INT	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-10
Italy	CAB-7513ACI=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-11
Japan, North America	CAB-7513AC=	14 feet (4.3 m)	20 A, 125 VAC	Figure 2-12
	CAB-AC-2500W-US1=		16 A, 250 VAC	Figure 2-19
	CAB-AC-C6K-TWLK=		16 A, 250 VAC	Figure 2-13
South Africa	CAB-7513ACSA=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-14
Switzerland	CAB-ACS-16=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-15
Switzerland	CAB-ACS-10=	7 feet (2.3 m)	10 A, 250 VAC	Figure 2-22
United Kingdom	CAB-7513ACU=	14 feet (4.3 m)	13 A, 250 VAC	Figure 2-16
China	CAB-AC16A-CH	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-23
1900 W Power Supply (PWR-1900-AC/6=)				
North America (locking)	CAB-GSR16-US(=)	14 feet (4.3m)	250VAC, 20A	Figure 2-17
Europe	CAB-GSR16-EU(=)	14 feet (4.3m)	250VAC, 16A	Figure 2-17
International	CAB-AC16A-90L-IN(=)	14 feet (4.3m)	250VAC, 16A	Figure 2-17
2700 W Power Supply (PWR-2700-AC)				

Table 2-20 AC-Input Power Cord Options (continued)

Locale	Part Number	Length	Plug Rating	Power Cord Reference Illustration
North America (locking)	CAB-GSR16-US(=)	14 feet (4.3m)	250VAC, 20A	Figure 2-17
Europe	CAB-GSR16-EU(=)	14 feet (4.3m)	250VAC, 16A	Figure 2-17
International	CAB-AC16A-90L-IN(=)	14 feet (4.3m)	250VAC, 16A	Figure 2-17
China	CAB-AC16A-CH=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-23
Continental Europe	CAB-AC-2500W-EU=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-18
International	CAB-AC-2500W-INT=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-10
Israel	CAB-AC-2500W-ISRL=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-24
Japan, North America (nonlocking plug) 200–240VAC operation	CAB-AC-2500W-US1=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-19
Japan, North America (locking plug) 200–240VAC operation	CAB-AC-C6K-TWLK=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-13
Japan, North America 100–120VAC operation[1]	CAB-7513AC=	14 feet (4.3 m)	20 A, 125 VAC	Figure 2-12
South Africa	CAB-7513ACSA=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-14
Switzerland	CAB-ACS-16=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-15
Australia, New Zealand	CAB-AC-16A-AUS=	14 feet (4.3 m)	16A,250 VAC	Figure 2-25
Power Distribution Unit (PDU(=)[2]	CAB-C19-CBN	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-26
3000 W Power Supply (WS-CAC-3000W)				
Continental Europe	CAB-AC-2500W-EU=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-18
International	CAB-AC-2500W-INT=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-10
Japan, North America (nonlocking plug) 200–240VAC operation	CAB-AC-2500W-US1=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-19
Japan, North America (locking plug) 200–240VAC operation	CAB-AC-C6K-TWLK=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-13

Table 2-20 AC-Input Power Cord Options (continued)

Locale	Part Number	Length	Plug Rating	Power Cord Reference Illustration
Japan, North America 100–120VAC operation[3]	CAB-7513AC=	14 feet (4.3 m)	20 A, 125 VAC	Figure 2-12
Switzerland	CAB-ACS-16=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-15
China	CAB-AC16A-CH=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-23
Australia, New Zealand	CAB-AC-16A-AUS=	14 feet (4.3 m)	16A,250 VAC	Figure 2-25
4000 W Power Supply				
North America	WS-CAC-4000W-US=	12 feet (3.6m)	250VAC, 30A	Figure 2-20
International	WS-CAC-4000W-INT=	12 feet (3.6m)	250VAC, 30A	Figure 2-21
6000 W Power Supply				
People's Republic of China	CAB-AC16A-CH=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-23
Continental Europe	CAB-AC-2500W-EU=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-18
International	CAB-AC-2500W-INT=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-10
Israel	CAB-AC-2500W-ISRL=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-24
Japan, North America (nonlocking plug) 200–240VAC operation	CAB-AC-2500W-US1=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-19
Japan, North America (locking plug) 200–240VAC operation	CAB-AC-C6K-TWLK=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-13
Japan, North America 100–120 VAC [4]	CAB-7513AC= [4]	14 feet (4.3 m)	20 A, 125 VAC	Figure 2-12
Switzerland	CAB-ACS-16=	14 feet (4.3 m)	16 A, 250 VAC	Figure 2-15
Australia, New Zealand	CAB-AC-16A-AUS=	14 feet (4.3 m)	16A,250 VAC	Figure 2-25

1. The 3000 W power supply operating on 110 VAC delivers 1400 W.
2. The PDU power cable is designed for users who power their switch from a PDU. The end of the cable that plugs into the Cisco 7600 series router chassis has a C19 connector; the other end of the cable that plugs into the PDU has a C20 connector.
3. The 3000 W power supply operating on 110 VAC delivers 1400 W.
4. The 6000 W power supply operating on two 110 VAC inputs delivers 2900 W. When operating with 100–120VAC, you must use two AC power cords and the power supply output is limited to 2900 W.

AC Power Cord Illustrations

This section contains the AC power cord illustrations. Note that an AC power cord may be used with several power supplies. See the power supply specifications tables for the correct AC power cord illustrations for your power supply.

Figure 2-1 CAB-AC15A-90L-US(=)

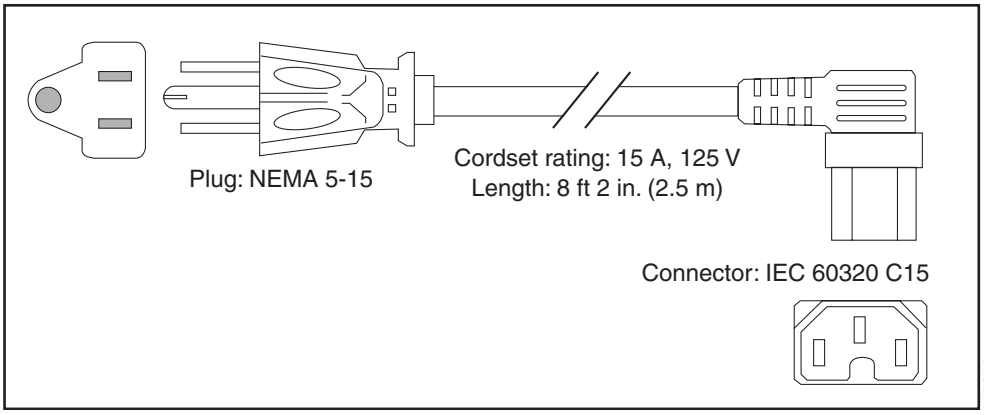


Figure 2-2 CAB-AC10A-90L-EU(=)

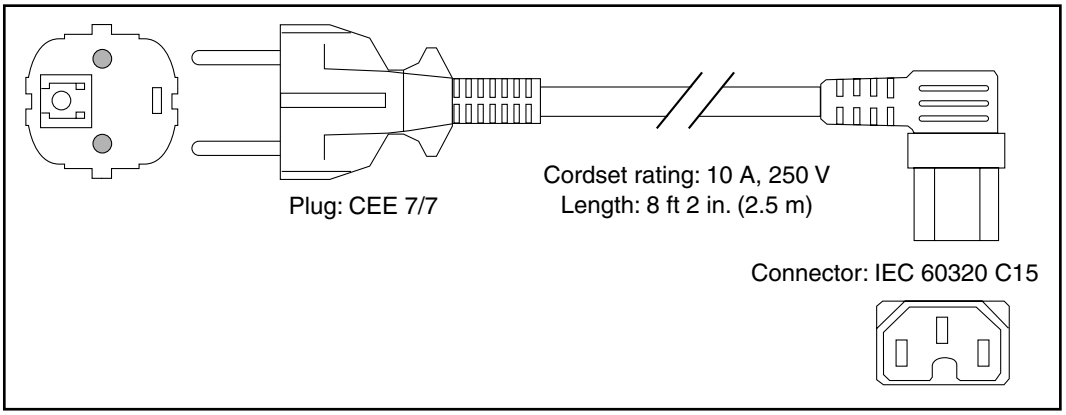


Figure 2-3 CAB-AC10A-90L-UK(=)

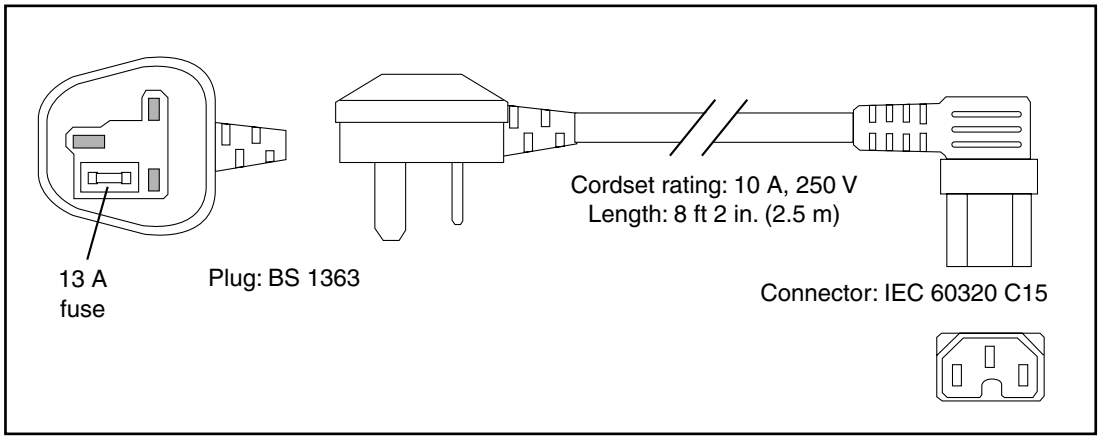


Figure 2-4 CAB-AC10A-90L-IT(=)

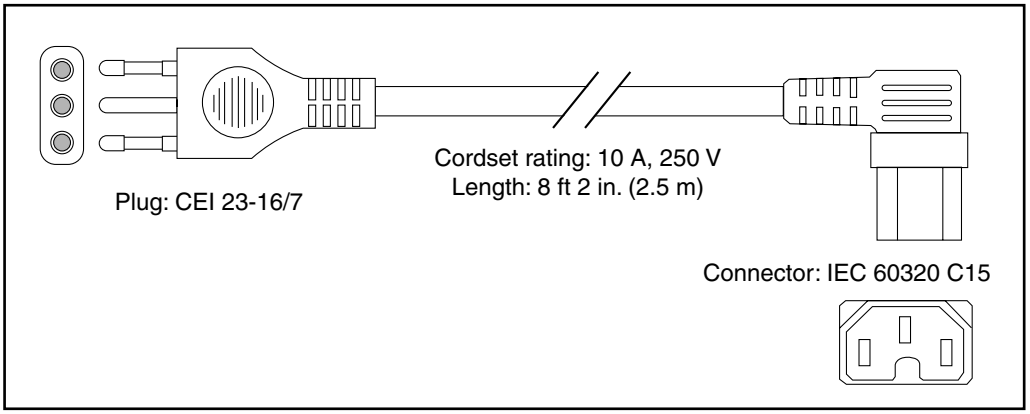


Figure 2-5 CAB-AC10A-90L-AU(=)

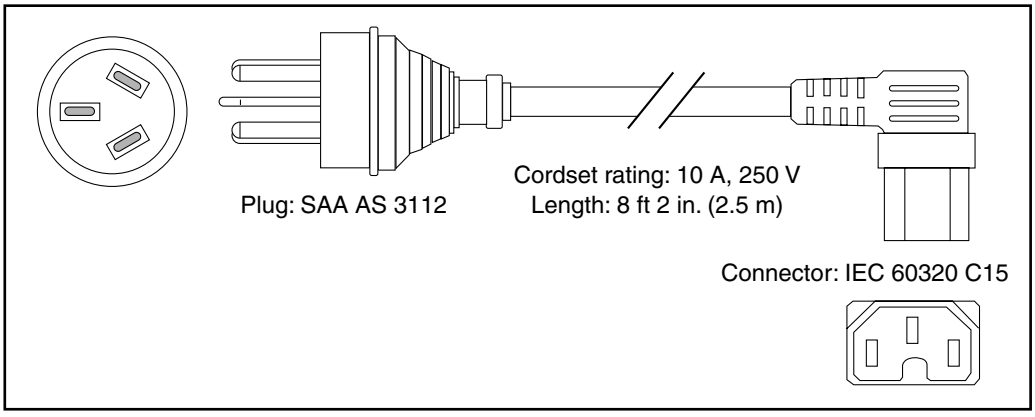


Figure 2-6 CAB-7513ACR=

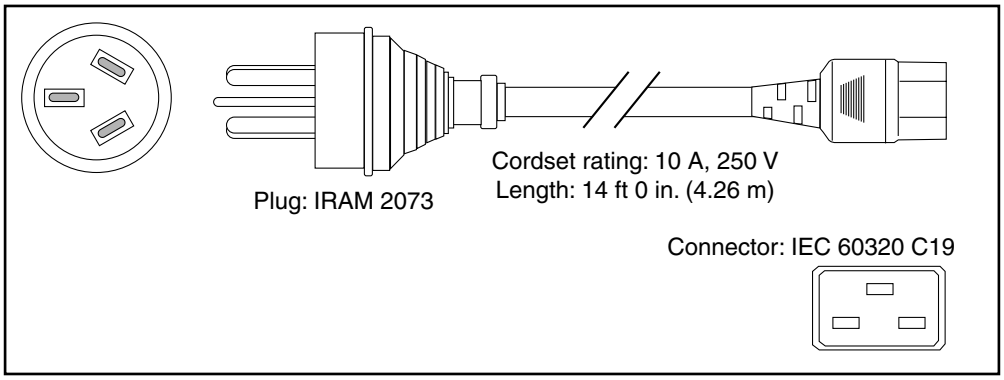


Figure 2-7 CAB-7513ACA=

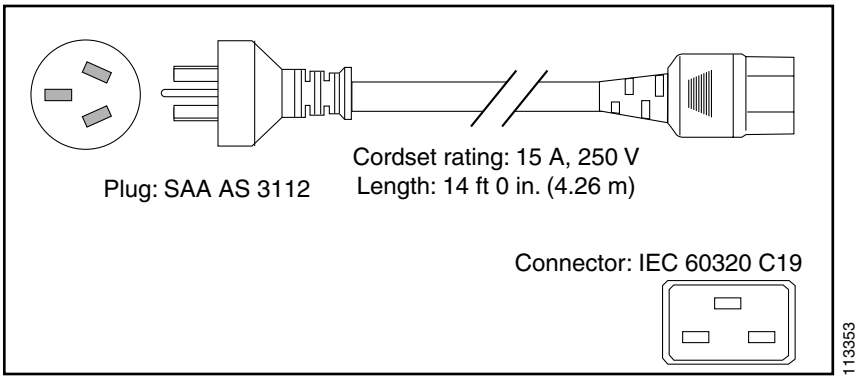


Figure 2-8 CAB-7513ACE=

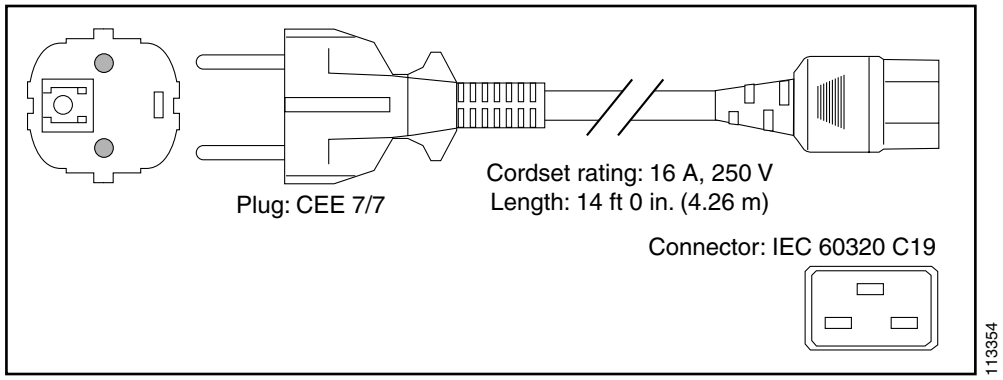


Figure 2-9 CAB-2500W-EU=

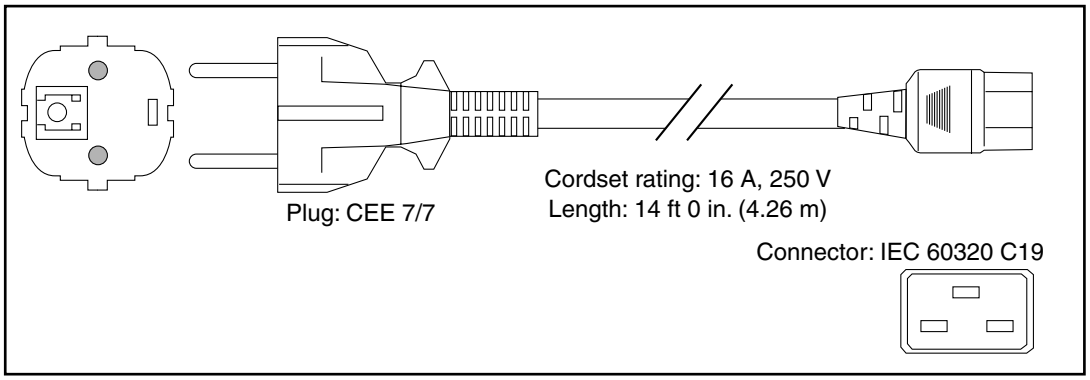


Figure 2-10 CAB-AC-2500W-INT=

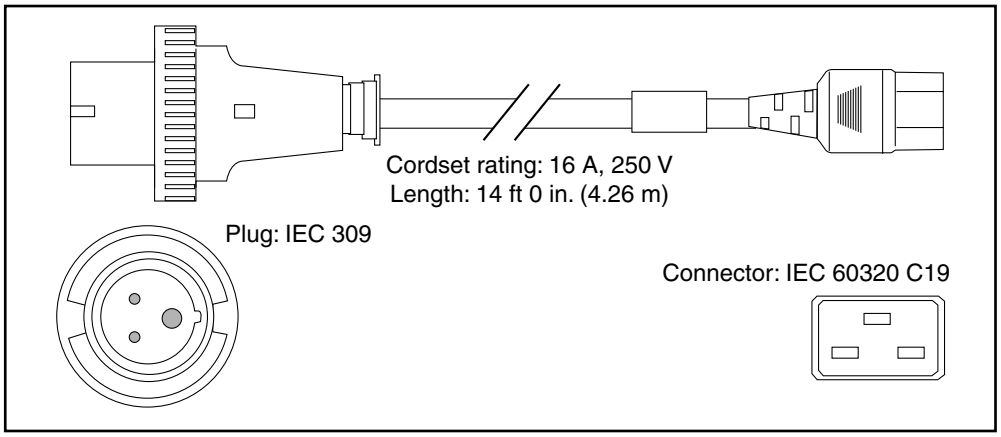


Figure 2-11 CAB-7513ACI=

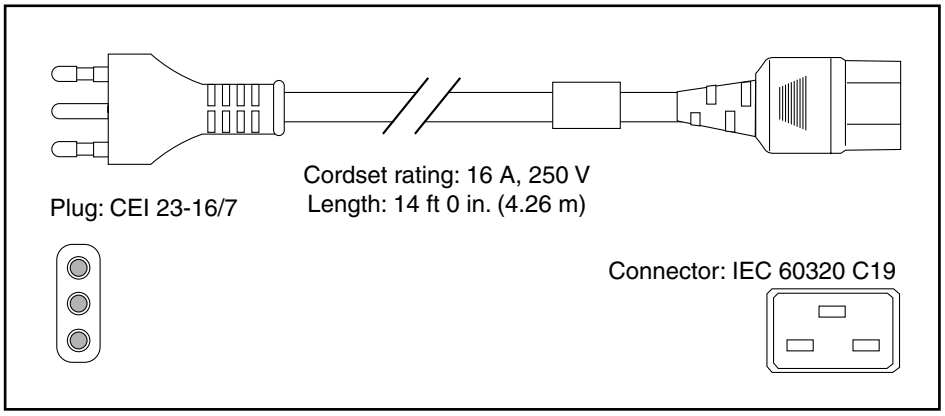
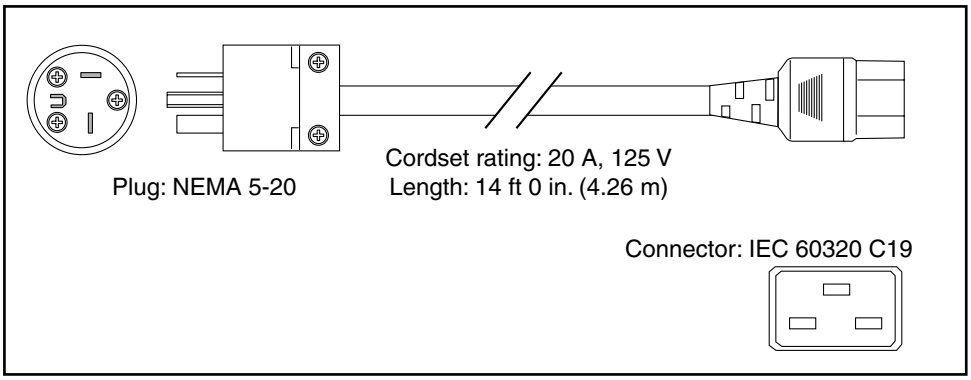


Figure 2-12 CAB-7513AC=



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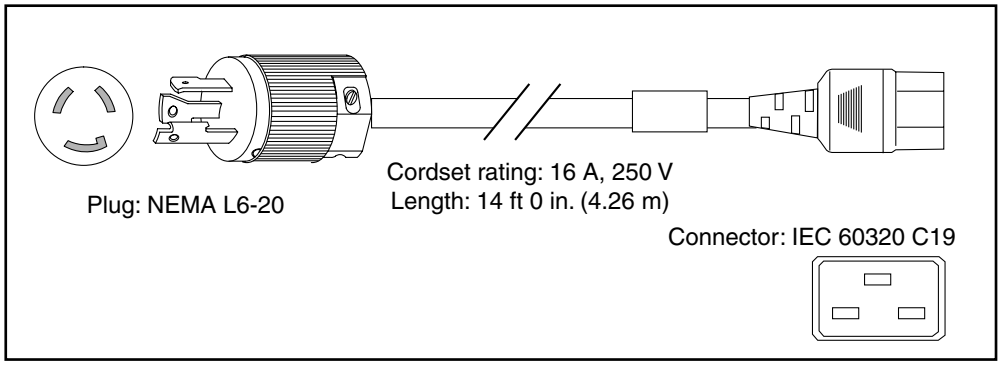

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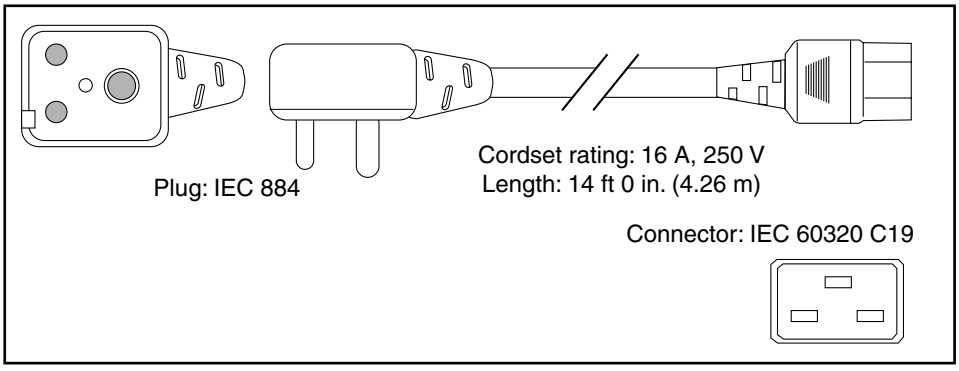
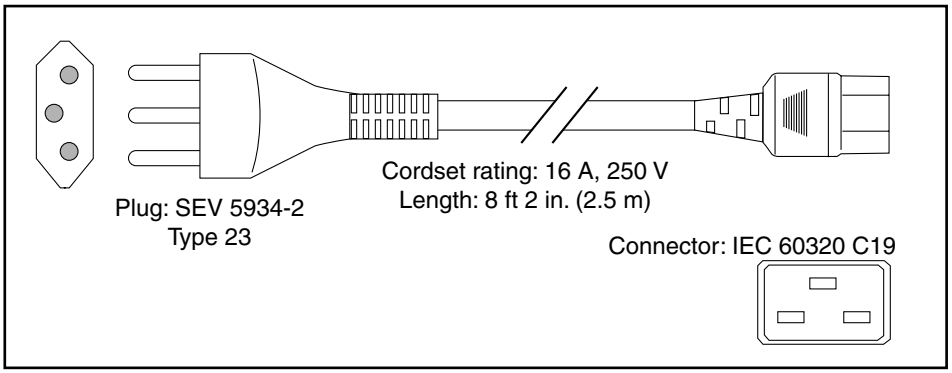


Figure 2-15 CAB-ACS-16=



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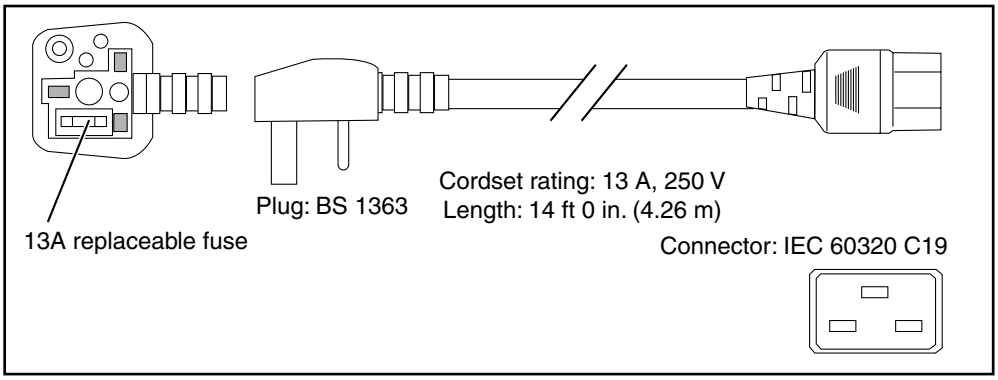


Figure 2-17 AC Power Cord Plugs and Appliance Coupler for the 1900 W Power Supply

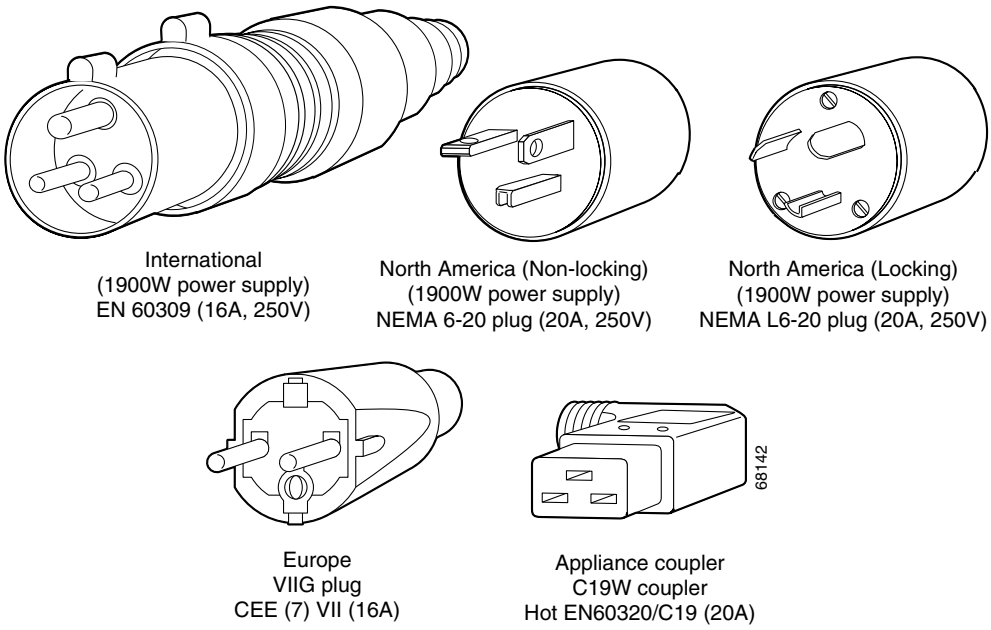


Figure 2-18 CAB-AC-2500W-EU=

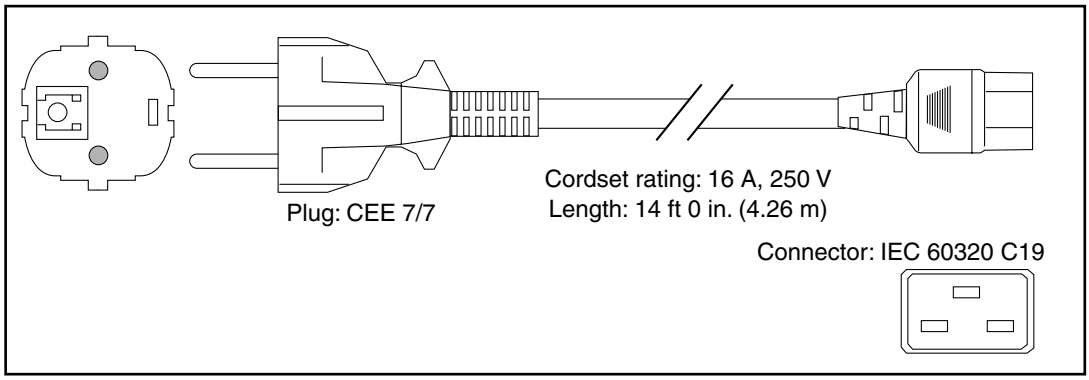


Figure 2-19 CAB-AC-2500W-US1=

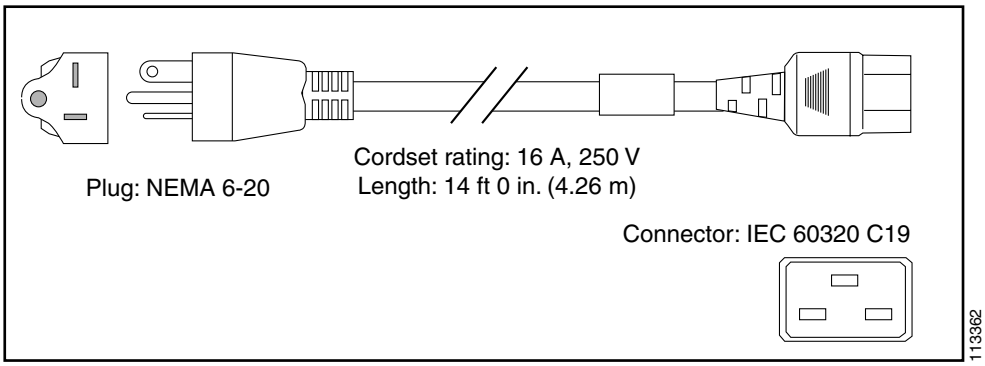
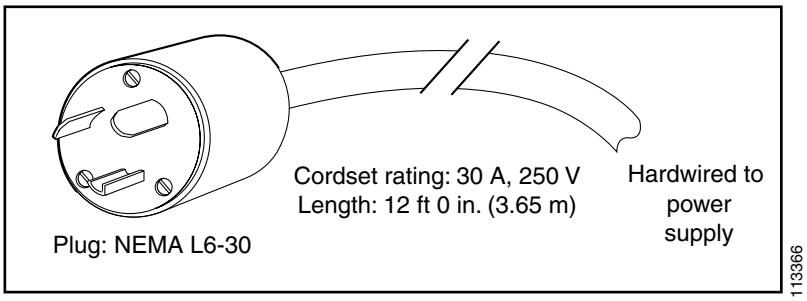


Figure 2-20 WS-CAC-4000W-US=



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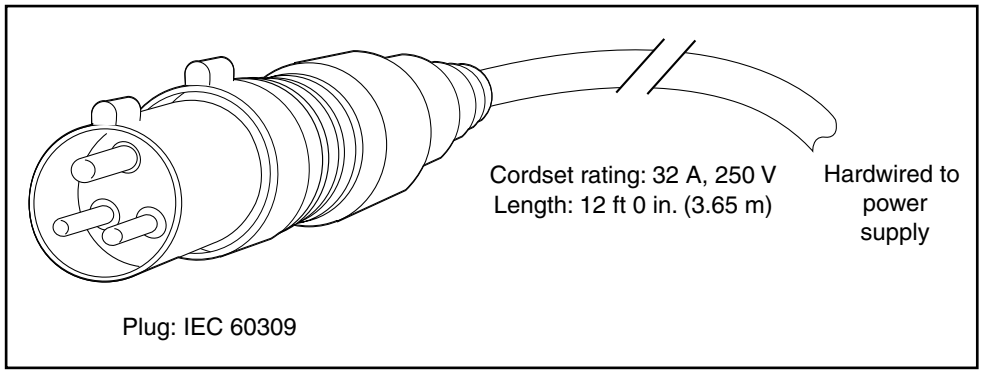


Figure 2-22 CAB-ACS-10=

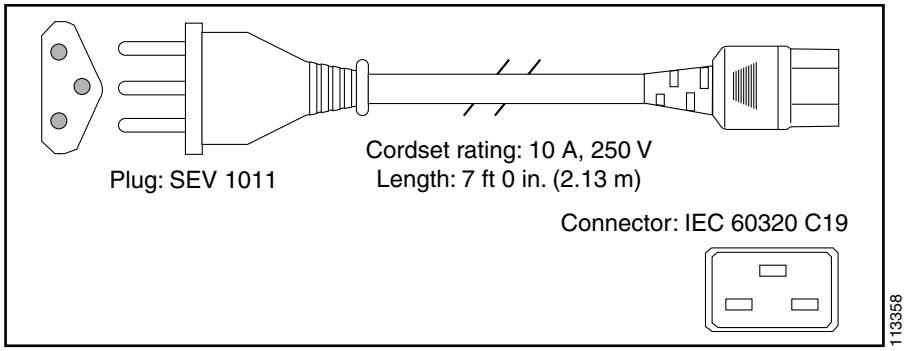


Figure 2-23 CAB-AC16A-CH=

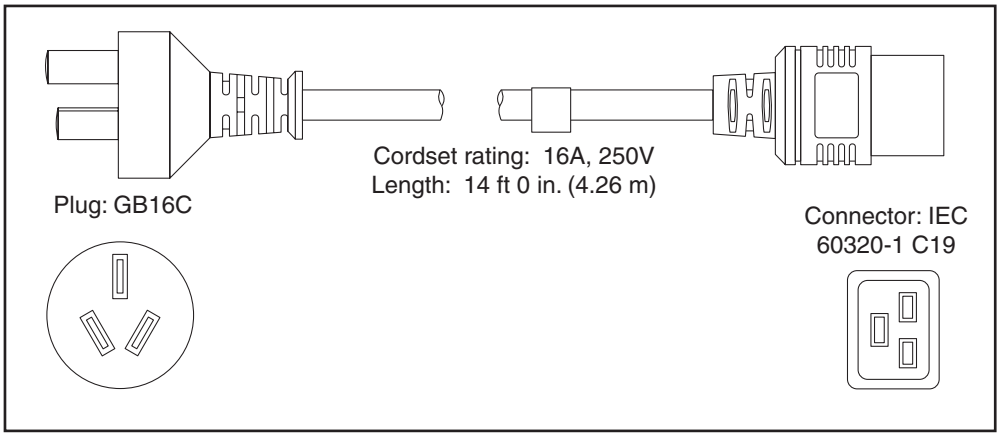


Figure 2-24 CAB-AC-2500W-ISRL=

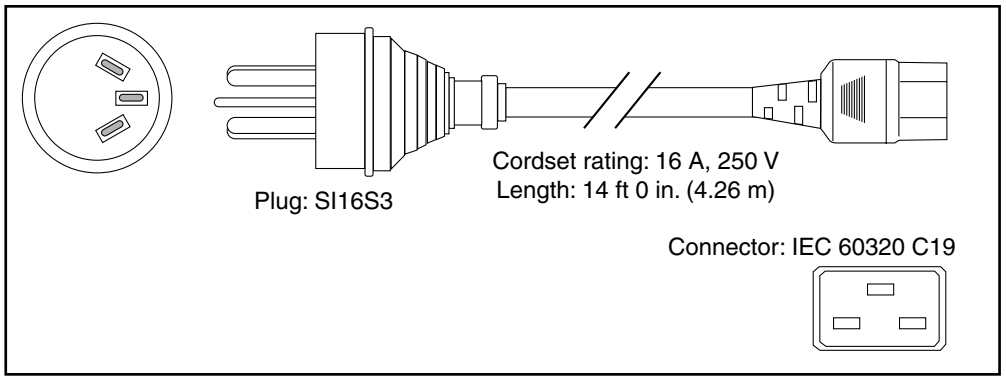


Figure 2-25 CAB-AC-16A-AUS

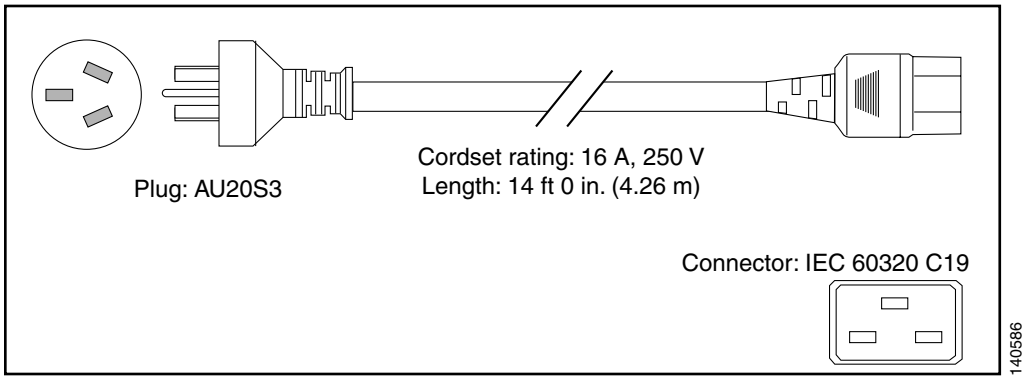
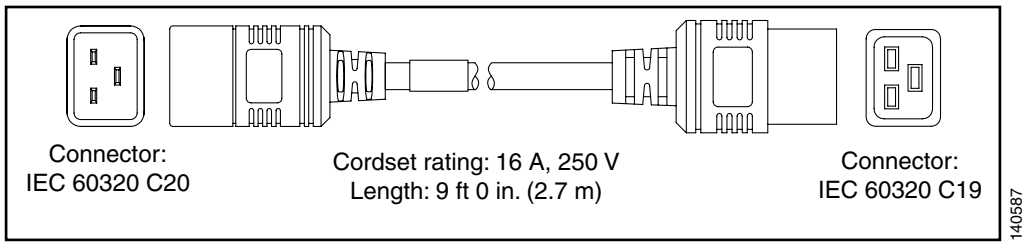


Figure 2-26 CAB-C19-CBN



DC-Powered Systems

Basic guidelines for DC-powered systems include the following:

- Each chassis power supply should have its own dedicated input power source. The source must comply with the safety extra-low voltage (SELV) requirements in the UL 60950, CSA 60950, EN 60950, IEC 60950 standards.
- The circuit must be protected by a dedicated two-pole circuit breaker. The circuit breaker should be sized according to the power supply input rating and local or national code requirements.

- The circuit breaker is considered the disconnect device and should be easily accessible.
- The system ground is the power supply and chassis ground.

Caution Do not connect the DC-return wire to the system frame or to the system grounding equipment.

Site Planning Checklist

Table 2-21 lists the site planning activities that you should perform prior to installing the Cisco 7600 series router. Completing each activity helps ensure a successful router installation.

Table 2-21 Site Planning Checklist

Task No.	Planning Activity	Verified By	Time	Date
1	Space evaluation: Space and layout Floor covering Impact and vibration Lighting Maintenance access			
2	Environmental evaluation: Ambient temperature Humidity Altitude Atmospheric contamination Airflow			
3	Power evaluation: Input power type Power receptacles (15A/20A/30A)) Receptacle proximity to the equipment Dedicated (separate) circuits for redundant power supplies UPS for power failures DC systems: Proper gauge wire and lugs			
4	Grounding evaluation: Circuit breaker size CO ground (AC- and DC-powered systems)			
5	Cable and interface equipment evaluation: Cable type Connector type Cable distance limitations Interface equipment (transceivers)			
6	EMI evaluation: Distance limitations for signaling Site wiring RFI levels			